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Accidents and Field Medical Provision

by Andy Smith (AVS) [University of Genoa]

Image 1. A typical field-medic's bag.

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No one knows for sure how frequently accidents occur in humanitarian demining. This is partly because the details of accidents involving state employees are rarely shared, and national laws often restrict access to police or military reports. It is also because there is a frequent failure to comply with the reporting requirements described in the International Mine Action Standards (IMAS). IMAS 10.60 requires that “an accident in which a mine, ERW or explosives harms a demining employee, visitor, or member of the local population” shall be investigated and the report made available. However, although it is a requirement to share the results of investigations, it is currently not entirely clear with whom the results should be shared. Many accident reports were included in the Database of Demining Accidents (DDAS) between 1995 and 2011, but few have been shared recently.

Not having all the data means that it is not possible to provide a well-informed estimate of accident frequency. The only known study of accident frequency was conducted twenty years ago in Afghanistan, when all insurance records were made available along with all work schedules.² The statistics on accident frequency presented in this article derive from the Afghanistan study; all other statistics discussed are from the DDAS.

The number of hours worked, number of deminers actually in the field, and the number of reported accidents and insurance claims were all made available. The results of the study indicated that we might expect one severely injurious accident per 32 field deminers every year. However, this ratio may be misleading. The working context, the explosive hazards present, and the equipment available all have an impact on accident frequency, quite apart from the quality of the training or the supervision at any worksite.



Image 2. A stretcher being used to transport recovered mines in a minefield in Zimbabwe.¹

The data available to the Afghanistan study included all insurance claims, including those that were not related to explosive events. Perhaps surprisingly, there were more claims related to non-explosive events than there were for explosive-related injuries. The study also found that the consequences of all medical emergencies were sometimes profoundly affected by the level of medical and medevac provision that was available, a situation that has not changed.

IMAS 10.40 covers medical support to demining operations. It requires demining organizations to “be properly trained and equipped to respond to demining accidents,” but the medical support that it suggests is usually recommended, not required, because what can be reasonably achieved can depend on the context. Among the limited IMAS 10.40 requirements that IMAS compliant organizations must provide at each worksite are skilled medics, appropriate casualty transport, an efficient means of communication, and an accident response plan tailored for each worksite. A study of the DDAS accident records provides strong evidence that these are reasonable requirements.

Features that influence the outcome of an accident are not always causes of the accident. However, features can be things that make the consequences of the accident worse. An inadequate medical provision is noted in 14 percent of recorded accidents, but there are no records in which a trained medic gave inappropriate treatment. In some cases there was no trained or appropriately-equipped medic, in others, there was no ambulance vehicle, communications system, or medevac plan. In several, the casualty was taken to a medical facility that lacked the capacity to treat their injuries.

The Provision of Skilled Medics

Most of a field medic’s daily responsibilities involve providing mundane medications and first aid to the team, and sometimes to the community where they work. The rarity of demining accidents means that many medics have never seen a severe demining accident, so their ability to respond appropriately depends heavily on their training and experience prior to working in humanitarian mine action.

In Image 1, the field medic’s bag contains medicines that are fairly typical. Most are for everyday medical problems rather than injury because the medic often acts as the team doctor as well as a trauma paramedic. The drugs shown are common antibiotics, anti-flatulence drugs, and treatment for infected gums and anxiety disorders. A well-equipped medic will also have all the equipment necessary to respond to a traumatic injury.



Image 3. A demining vehicle after a road traffic accident, a common cause of deminer injury.

Accidents in the working area are rare, so medics often spend many hours sitting and watching the other team members work each day. However, they have to be ready to react swiftly and professionally if an emergency occurs, and the DDAS accident records show that they have almost always done this well. Medics have been a casualty in almost two percent of all accidents recorded in the DDAS, and in four of these accidents the medic died. Six of these accidents involved other casualties who the injured medic was unable to treat.

To avoid risk to medics, some demining organizations require them to stay outside the working area while a casualty is brought to them. Other organizations allow the medic to go to the casualty as long as they always walk in safe areas. There appears to be no advantage in preventing the medic from going directly to the casualty, because most of the explosive-related accidents involving medics occurred in areas that were believed to be safe. To reduce the risks associated with the medic being accidentally incapacitated, some organizations employ skilled medical assistants and, following the IMAS, most organizations train all deminers in basic first aid.

Appropriate Casualty Transportation

Appropriate transportation is often a well-equipped ambulance, but certain contexts may require a boat or a helicopter. Whatever the vehicle, it must be available to transport a casualty without delay. While some injuries are obvious and treatment can begin in the field, other life-threatening trauma can only be diagnosed and treated after reaching a well-equipped medical facility. The medevac vehicle must also be appropriately fitted and equipped to carry the casualty securely, often over rough ground.



Image 4. The standard of ambulances used in demining varies from a mattress thrown into the back of a vehicle (left) to hygienic and well-equipped vehicle conversions (right).

The demining ambulance shown on the left in Image 4 is obviously not a safe means of transporting casualties. By contrast, the demining ambulance shown on the right is adequately equipped, but only for one casualty. In over 12 percent of recorded demining accidents, there has been more than one casualty.

In insecure areas, some demining groups always send a back-up vehicle with an ambulance to provide assistance in case of trouble en route. Other demining organizations have used different approaches with the deminers' transport vehicle also functioning as the ambulance. In one of these cases, a Land Rover being used as both transport vehicle and ambulance was carrying eight people when it was driven into the working area and parked on top of an anti-tank mine that had

been missed during previous searches. The only means of communication was a radio that was destroyed in the explosion. There was no other vehicle, so no ambulance or medic. Two deminers died at the scene and two others died while being transported to hospital in a flat-bed truck and in four-wheel-drive vehicles owned by the public. Their unplanned journey took more than seven hours.³

In another accident in which the ambulance was being used as a transport vehicle, it was travelling along a road believed safe when an anti-tank mine detonated under a rear wheel, and its long-range fuel tank caught fire.⁴ Three deminers died and seven were injured, including both medics, one of them severely. By chance, another demining group working nearby was able to send their medic and ambulance to help.



Image 5. A converted vehicle capable of carrying two casualties.



Image 6. A well-equipped demining ambulance with space for only one incapacitated casualty.



Image 7. A demining ambulance, after casualties were removed, that detonated an anti-tank mine with its rear left wheel while being used as a transport vehicle.⁴



Image 8. A demining transport truck that detonated a landmine en route to the worksite.

As well as providing a dedicated vehicle, organizations should ensure ambulances are equipped to be as comfortable as possible for the casualty and to allow treatment to continue during transit. In another recorded accident, a severely injured casualty was safely loaded into the ambulance before the driver crashed into a tree as he turned the vehicle around.⁵ The impact threw an unsecured oxygen bottle across the back of the ambulance hitting the medic on the head, inflicting severe brain injuries.

A well-equipped ambulance with securely-fitted oxygen bottles like that shown in Image 6 cannot have the seating to safely transport a demining team and their equipment. The provision of a skilled medic and a single dedicated well-equipped ambulance may not be enough when there are multiple casualties. All demining organizations should be encouraged to practice medevac involving several simultaneous casualties so that the medics become familiar with the assessment and prioritization of multiple trauma injuries.

In another accident, the demining transport truck in Image 8 was carrying 25 people when it detonated a mine while driving to the worksite.⁶ Fortunately the organization's ambulance vehicle was following behind. To ensure that there were no more mines, search and clearance were conducted at the same time as emergency treatment was given to eight injured people. The medic immediately made a radio request for assistance because there were too many casualties to be transported in the ambulance. Uninjured deminers

reacted with self-discipline, searching for other mines while their colleagues were being stabilized, and a second ambulance arrived quickly. The team had practiced medevac procedures involving multiple casualties so they were well prepared to react professionally.

The accident record provides abundant evidence that a dedicated ambulance vehicle and medic are needed. There is also evidence that ambulances should not be used to transport deminers and should not be driven into the worksite. The record also provides evidence of the need for more than one means of communication at every worksite and a well-rehearsed medevac plan that covers the possibility of there being multiple casualties.



Image 9. The picture shows deminers carrying a casualty down a mountain to the nearest road and the ambulance.⁷



Image 10. Around the world, the medevac varies from helicopter airlift to a relay of boats and vehicles.

All Reasonable Effort

What is considered **reasonable** will often depend where the worksite is. If medevac starts far from maintained roads or the nearest viable hospital, it cannot be conducted at an ideal speed but, knowing that the work will be conducted remotely, other provisions can be enhanced to reduce the impact of any delay. The team's medic(s) should have the necessary skills to diagnose, stabilize, and treat those in their care during lengthy transit and there must be enough medical equipment and consumables to meet all predictable needs. When it is known that alternative medics will not be readily available, trained medical assistants should always be available in case the medic becomes ill or is injured. Senior managers should maintain a detailed medevac exercise record and ensure that the provisions are optimized to prevent the medevac itself from making things worse for the casualty.

To comply with the IMAS, practiced medevac plans and proven communications systems must be in place, however remote the worksite, and coordination between all those who may be involved in an evacuation must be established before work in the hazardous area starts.

Whether by road, air, or river, medevac exercises should be conducted to give confidence that all reasonable effort has been made to recognize and overcome potential problems. Conducting medevac exercises should be a priority for new teams, or when starting work in new areas.

The Need to Share Accident Reports

For more information about the events surrounding the accidents mentioned in this article, please see the DDAS record number of each event as referenced in the endnotes. The

DDAS is now a part of the demining Accident and Incident Database (AID) housed in James Madison University's Global CWD Repository (<https://commons.lib.jmu.edu/cisr-dda/>). Its records provide many real-life examples in support of training and risk management. However, it is far from complete, which is unfortunate because the more detailed accident reports that it contains, the more use it can be. This article proves that even old reports can provide useful evidence of what works and what does not, so all accident and incident reports should be shared. Please send any accident and incident reports that you have for inclusion in AID to cisr-reporting@jmu.edu. Names and identifiers are always redacted so that no organization or individual suffers for sharing information that may help others avoid injury or death, and which supports the professional development of risk management in humanitarian demining. ©

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Accidents (DDAS) and served on the International Mine Action Standards (IMAS) Review Board for 11 years. In addition to developing demining personal protective equipment (PPE), he has worked at all levels in HMA from surveyor/deminer to NGO program manager and Chief Technical Advisor to UNDP country programs and is currently a research associate at the University of Genoa.